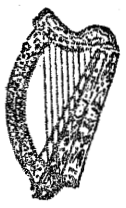

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# THE PARASITOLOGY OF IRISH MUSSELS

By

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Investigations of the distribution of three parasites of mussels, an internal copepod parasite of the gut (Mytilicola intestinalis), an external decapod parasite in the gill region (Pinnotheres pissum) and an analid shell parasite (Polydora ciliata) were carried out from October 1971 to April 1972.

Samples from 26 locations around the Irish coast were investigated. One hundred mussels from each sample were weighed, measured in 5 mm groups, boiled and the following were estimated as percentages of the whole mussel:-

a. Shell;

b. Meat; and

c. "Loss".

Each individual mussel was examined for the external parasite P. pissum and each shell was examined for the shell parasite P. ciliata. Shells with a total of 11 or more shell parasites were judged to be "heavily infested", between 5 and 11 parasites "moderately" and less than 5 "lightly" infested.

Examination for M. intestinalis was always carried out on fresh mussels. Fifty mussels were examined from each batch and this was repeated at least three times and five times where possible. As some supplies of mussels were kept in a refrigerator pending examination it was of interest to note the Mytilicola intestinalis remained alive after three days at $-4^{\circ}C$.

## RESULTS

Table I gives details of the locations examined and the percentage occurrence of each parasite.

### M. intestinalis.

This species was confined to two areas, namely, Galway Bay on the west coast and the Youghal/Cork/Kinsale area on the south coast. The mussels examined from the five places in

Galway Bay had infestation rates in excess of 60%, the infestation rate at Clarenbridge being 91.5% (see Fig.1 and Table 2 for locations surveyed and percentage infestation).

The size range of the mussels examined was from 35 to 75 mm and in many locations only above the minimum size acceptable for commercial purposes (Table 2).

On both sides of Galway Bay mussels were heavily infested with up to 15 parasites per mussel in some cases.

The incidence of M. intestinalis has remained fairly static in recent years being confined to Galway Bay and the estuaries in the south of Ireland. Only Youghal Harbour is a new location recorded.

P. pissum.

The occurrence of this parasite is indicated in Table 3 and Fig.2. It was found in estuaries in the south, south-west and north-west coasts. The highest infestation rate was at Fenit, Co. Kerry and the lowest at Cromane, Co. Kerry.

This parasite scrapes the gill of the mussel thus robbing the mussel of food and it can also cause damage to the gill. Because of the way in which the crab robs the mussel of its food, and the manner in which it is adapted for that purpose, we are justified in regarding it as a parasite. (Flattely et al 1922).

P. ciliata.

This parasite burrows through the shell and causes pearly excresences to grow on the inside of the shell which prevents muscular development and often impinges on the posterior aductor muscle. Furthermore it often interferes with the production of genital products (Field, 1922). The presence of this parasite did not affect the "meat" content of the mussel but it could well reduce the mussel life span.

The incidence of this parasite is widespread (Table 4 and Fig.3) and at Malahide all the mussel shells examined were infested. Only in four locations was it absent.

The shells of Wexford mussels were 65% infested. These mussels were the best fleshed mussels in the country, with an average meat yield of over 25%.

This parasite was introduced into Australia about 1870. It compelled the oyster farmers there to cease to grow oysters on the bottom, and to use stakes or stone slabs (Nelson).

Discussion:

Table 5 gives the degree of infestation with the three parasites, the meat yield, shell weight and "loss" for some localities. In some of these cases, i.e. Kinsale and Rosshill the meat yield was satisfactory for intertidal mussels but at Ballyvaughan and Kinvara the meat yield was poor no doubt due in part to heavy infestation with two or more of these parasites.

REFERENCES

Field, I.A. (1922), Biology and economic value of the sea mussels Mytilius edulis. Bulletin. Bureau of Fisheries. 38. 1921-22. Document No. 922. July 1922.

Flattely, F.W, Walton, C.L. and Thomson, J.A. (1922). The Biology of the sea shore. Sidgwich and Jackson, Ltd., London.

Nelson, T.C. (1922). Comment on the importation of foreign shell fish. Co. Rept. NATL Shellfisheries Association.

TABLE I Parasites in Mussels and Mussel Shells

| Position | Percentage infestation | | |
|---|---|---|---|
| | Mytilicola intestinalis | Polydora ciliata | Pinnotheres pissum |
| 1. Omeath | - | 19 | - |
| 2. Dundalk | - | 25 | - |
| 3. Mornington | - | 16 | - |
| 4. Skerries | - | 18 | - |
| 5. Malahide | - | 100 | - |
| 6. Wexford | - | 65 | - |
| 7. Waterford | - | 17 | - |
| 8. Dungarvan | - | 8 | 1 |
| 9. Youghal | 2.0 | 49 | 4.7 |
| 10. Cork | - | - | 1 |
| 11. Fountainstown | 40.0 | - | - |
| 12. Oysterhaven | - | 14 | - |
| 13. Kinsale | 10.0 | 31 | 13.5 |
| 14. Court MacSherry | - | 2 | - |
| 15. Cromane | - | 40 | 0.2 |
| 16. Fenit | - | 7.5 | 72 |
| 17. Poul na Sherry | - | 8 | 39 |
| 18. Ballyvaughan X | 74.4 | 37 | 17 |
| 19. Kinvara X | 64.4 | 19 | - |
| 20. Clarenbridge X | 91.5 | 6 | - |
| 21. Oranmore X | 66.66 | 7 | - |
| 22. Rosshill X | 84.0 | 34 | - |
| 23. Killary Harbour | - | - | - |
| 24. Sligo | - | - | - |
| 25. Donegal | - | - | 28 |
| 26. Malin | - | - | - |

X Galway Bay

TABLE 2 Occurrence of M. intestinalis in Irish mussels.

| Location | Size range in mm. | Number of Mussels examined | Percentage Infestation | Mean No. per mussel | Highest Individual Infestation |
|---|---|---|---|---|---|
| Youghal | 50 - 55 | 50 | - | - | - |
| | 56 - 60 | 50 | - | - | - |
| | 61 - 65 | 50 | - | - | - |
| | 66 - 70 | 50 | 2 | 0.02 | 1 |
| | 71 - 75 | 50 | 2 | 0.02 | 1 |
| Fountainstown | 51 - 55 | 50 | 40 | 0.70 | 2 |
| | 56 - 60 | 50 | 40 | 0.70 | 2 |
| | 61 - 65 | 50 | 40 | 0.80 | 2 |
| Kinsale | 51 - 55 | 50 | 8 | 0.08 | 1 |
| | 56 - 60 | 50 | 10 | 0.10 | 1 |
| | 61 - 65 | 50 | 8 | 0.08 | 1 |
| | 65 - 70 | 50 | 14 | 0.14 | 1 |
| Ballyvaughan | 46 - 50 | 50 | 50 | 1.50 | 3 |
| | 51 - 55 | 50 | 72 | 2.00 | 3 |
| | 56 - 60 | 50 | 88 | 3.00 | 6 |
| | 61 - 65 | 50 | 72 | 2.30 | 6 |
| | 66 - 70 | 50 | 90 | 4.20 | 12 |
| Kinvara | 51 - 55 | 50 | 40 | 3.20 | 15 |
| | 56 - 60 | 50 | 74 | 3.80 | 12 |
| | 61 - 65 | 50 | 56 | 2.00 | 7 |
| | 66 - 70 | 50 | 68 | 4.20 | 15 |
| | 71 - 75 | 50 | 84 | 5.30 | 14 |
| Clarenbridge | 46 - 50 | 50 | 96 | 0.96 | 1 |
| | 51 - 55 | 50 | 96 | 2.70 | 5 |
| | 56 - 60 | 50 | 80 | 4.20 | 11 |
| | 61 - 65 | 50 | 94 | 4.70 | 5 |
| Oranmore | 35 - 40 | 50 | 50 | 0.50 | 2 |
| | 41 - 45 | 50 | 56 | 0.60 | 3 |
| | 46 - 50 | 50 | 96 | 2.00 | 3 |
| Rosshill | 46 - 50 | 50 | 90 | 1.90 | 7 |
| | 50 - 55 | 50 | 78 | 4.20 | 10 |
| | 56 - 60 | 50 | 84 | 0.84 | 1 |

Table 3. Occurrence of P. Pissum.

| Location | % Infested | % Male | % Female | Mean No. per mussel. |
|---|---|---|---|---|
| 1. Omeath | - | - | - | - |
| 2. Dundalk | - | - | - | - |
| 3. Mornington | - | - | - | - |
| 4. Skerries | - | - | - | - |
| 5. Malahide | - | - | - | - |
| 6. Wexford | - | - | - | - |
| 7. Waterford | - | - | - | - |
| 8. Dungarvan | 1 | 0.5 | 0.5 | .01 |
| 9. Youghal | 4.7 | 2.0 | 2.7 | .047 |
| 10. Cork | 1 | 1.0 | - | .01 |
| 11. Fountainstown | - | - | - | - |
| 12. Oysterhaven | - | - | - | - |
| 13. Kinsale | 13.5 | 6.0 | 7.5 | .135 |
| 14. Courtmacsherry | - | - | - | - |
| 15. Cromane | 0.2 | - | - | - |
| 16. Fenit | 72 | 41 | 31 | .72 |
| 17. Poul na Sherry | 39 | 19 | 20 | .39 |
| 18. Ballyvaughan | 17 | 4 | 13 | .17 |
| 19. Kinvara | - | - | - | - |
| 20. Clarenbridge | - | - | - | - |
| 21. Oranmore | - | - | - | - |
| 22. Rosshill | - | - | - | - |
| 23. Killary Harbour | - | - | - | - |
| 24. Sligo | - | - | - | - |
| 25. Donegal | 28 | 14 | 14 | .28 |
| 26. Malin | - | - | - | - |

Table 4. Occurrence of *P. ciliata*.

| Location | Percentage infestation | | | | |
|---|---|---|---|---|---|
| | None | Light | Medium | Heavy | Total |
| 1.Omeath | 81 | 18 | 1 | - | 19 |
| 2.Dundalk | 75 | 16 | 8 | 1 | 25 |
| 3.Mornington | 84 | 14 | 1 | 1 | 16 |
| 4.Skerries | 82 | 15 | 3 | - | 18 |
| 5.Malahide | - | - | 50 | 50 | 100 |
| 6.Wexford | 35 | 33 | 14 | 18 | 65 |
| 7.Waterford | 83 | 7 | 6 | 4 | 17 |
| 8.Dungarvan | 92 | 3 | 3 | 2 | 8 |
| 9.Youghal | 51 | 39 | 8 | 2 | 49 |
| 10.Cork | 100 | - | - | - | - |
| 11.Fountainstown | 100 | - | - | - | - |
| 12.Oysterhaven | 86 | 13 | 1 | - | 14 |
| 13.Kinsale | 69 | 20 | 3 | 8 | 31 |
| 14.Courtmacsherry | 98 | 1 | - | 1 | 2 |
| 15.Cromane | 60 | 24 | 8 | 8 | 40 |
| 16.Fenit | 92 | 8 | - | - | 8 |
| 17.Poulnasherry | 92 | 7 | 1 | - | 8 |
| 18.Ballyvaughan | 63 | 10 | 6 | 21 | 37 |
| 19.Kinvara | 81 | 17 | 2 | - | 19 |
| 20.Clarenbridge | 94 | 5 | - | 1 | 6 |
| 21.Oranmore | 93 | 6 | 1 | - | 7 |
| 22.Rosshill | 66 | 28 | - | 6 | 34 |
| 23.Killary Harbour | 100 | - | - | - | - |
| 24.Sligo | 100 | - | - | - | - |
| 25.Donegal | 100 | - | - | - | - |
| 26.Malin | 100 | - | - | - | - |

Table 5. Percentage infestation of mussels with the three parasites meat yield, shell and "loss".

| Location | Degree of infestation (%) | | | Weight (%) | | |
|---|---|---|---|---|---|---|
| | Mytilicola intestinalis | Polydora ciliata | Pinnotheres pissum | Meat Yield | Shell | "Loss" |
| Youghal | 2.0 | 49 | 4.7 | 13.7 | 49.0 | 37.3 |
| Fountainstown | 40.0 | - | - | 10.0 | 47.7 | 42.3 |
| Kinsale | 10.0 | 31 | 13.5 | 15.3 | 52.7 | 32.0 |
| Ballyvaughan | 74.4 | 37 | 17.0 | 8.0 | 55.0 | 37.0 |
| Kinvara | 64.4 | 19 | - | 9.7 | 53.1 | 37.2 |
| Clarenbridge | 91.5 | 6 | - | 10.8 | 52.8 | 36.4 |
| Oranmore | 66.66 | 7 | - | 12.0 | 54.3 | 33.7 |
| Rosshill | 84.0 | 34 | - | 15.3 | 50.9 | 33.8 |

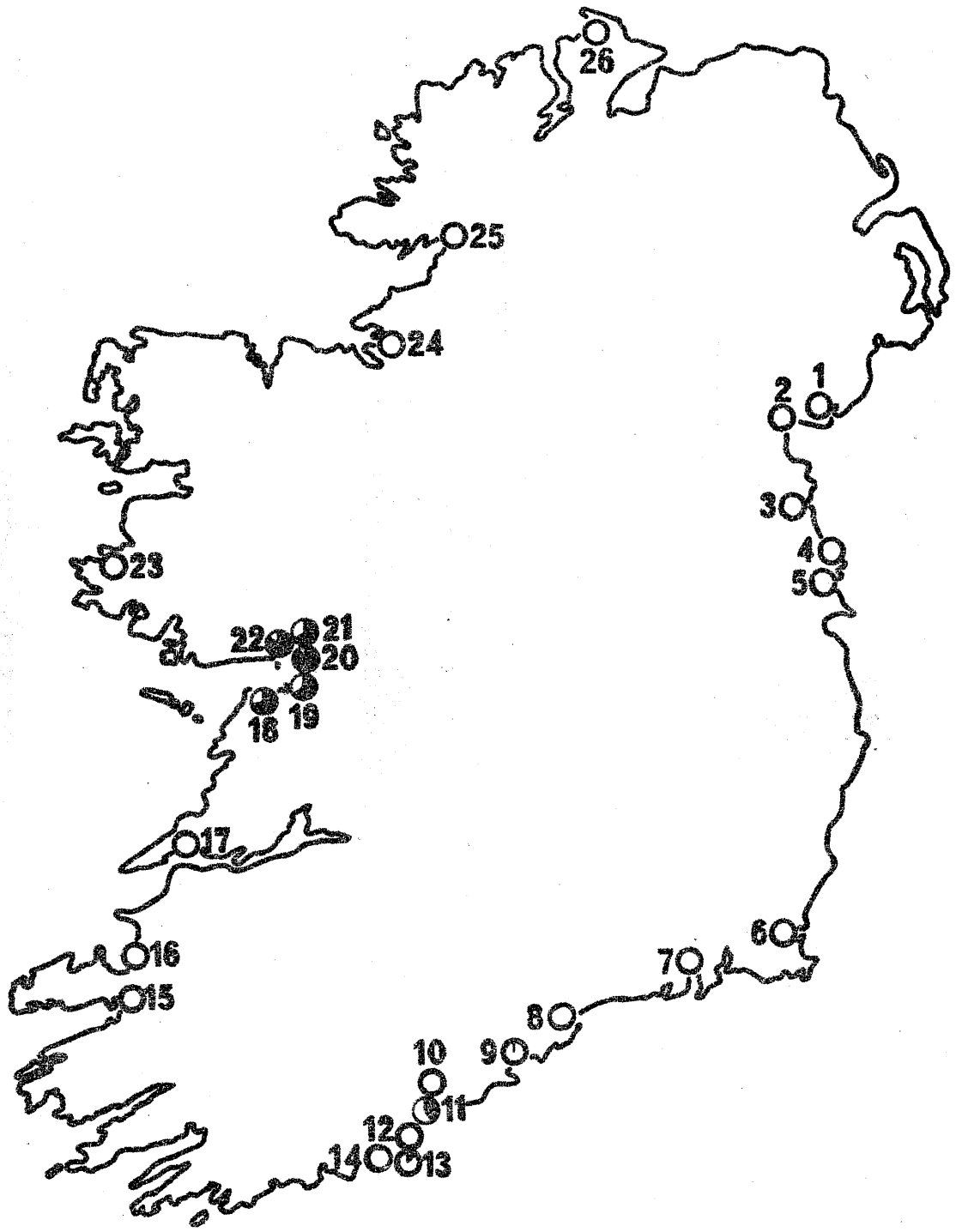


Fig.1. Map of Ireland showing general distribution of Mytilicola intestinalis in mussels.

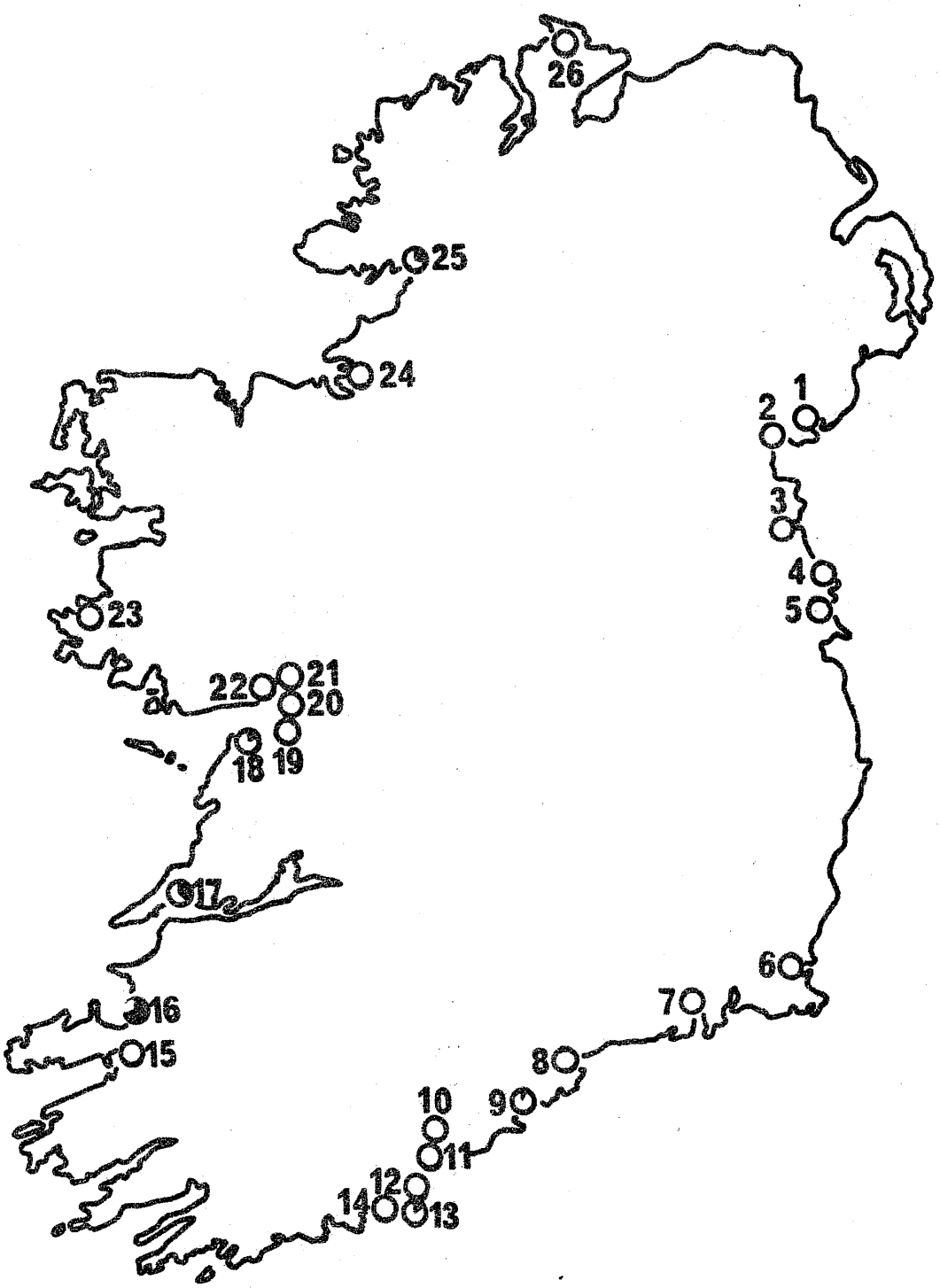


Fig.2. Map of Ireland showing general distribution of Pinnotheres pissum in mussels.

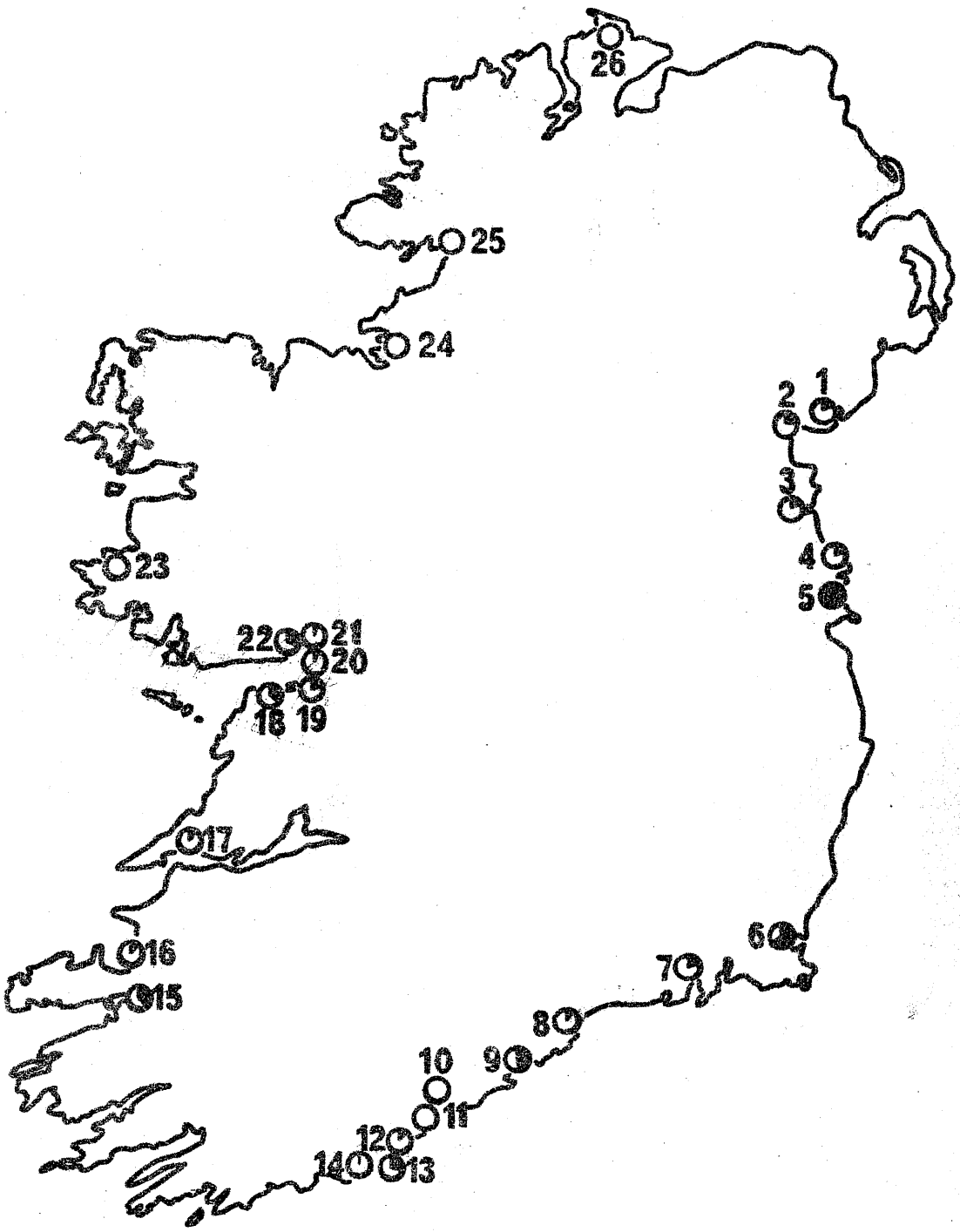


Fig.3. Map of Ireland showing general distribution of Polydora ciliata in mussel shell.